

Applicant : Tal Isaac Lavian and Robert Jaeger
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Filed : December 29, 2000
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Attorney's Docket No.: 10360-056001 / BA0366CIP

Amendments to the Specification:

In the title:

Please replace the title with the following rewritten title:

A Programmable Command-Line Interface API For Managing Operation of a Network
Device

Please replace the paragraph beginning at page 15, line 3, with the following amended paragraph:

Figure 7 is a block diagram of a network management server (NMS) securely communicating [[a]] network management protocol commands to a network device. System 700 in Figure 7 includes a network device 702 equipped with object-oriented capabilities described above, a network management server (NMS) 704 executing a network management application 706.

Please replace the paragraph beginning at page 16, line 20, with the following amended paragraph:

Figure 9 is a block-diagram illustrating a command-line interface (CLI) application programming interface (API) 902 for network devices. Access to a conventional CLI on a network device typically occurs through a terminal connected to the serial port of the network device. The user types in commands directly to the network device through this terminal to configure and monitor network device information. This CLI-API instead provides an object-oriented application programming interface for client application 226 in Figure 2 to develop programmatic interactions with the network device and develop more sophisticated operations. For example, client application 226 can create stateful applications that measure one or more variables on the network device and [[them]] then make decisions based on the combination of variables. In contrast, the user interfacing with the CLI of a network device cannot easily make such determinations and decisions.

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Please replace the paragraph beginning at page 16, line 31, with the following amended paragraph:

In this implementation, CLI-API 902 includes a set of classes compatible with the Java programming language to perform a variety of functions necessary when [[communication]] communicating over a network or serial link to a command-line interface. These classes include session management classes 904, input-output classes 906, configuration classes 908, macro-generation classes 910, and other classes 912 as needed to interface with the various network devices on a network. Of course, these classes are given only as an example to perform one set of functions and greater or fewer classes may be required depending on the applications specific requirements.

Please replace the paragraph beginning at page 17, line 8, with the following amended paragraph:

Session management classes 904 control the resources associated with establishing a communication session with a network device through the command-line interface. This may include performing authentication and authorization of the user and application. For example, obtaining a login name, an application identification, and/or a password. It also includes establishing network sessions, obtaining handles to references of the one or more sessions, and relinquishing the resources associated with the network device when the sessions are completed.

Please replace the paragraph beginning at page 17, line 23, with the following amended paragraph:

Macro generation classes 910 allows an application to create and [[registered]] register customized macro routines. For example, an application can be run that sets up numerous macros and stores them in persistent storage on a central server or network device for other applications to use later. This would make it easier to enhance the available functions using the

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CLI-API with a network device. Other classes 912 represent any other additional classes that client application 226 may use to interact with a network device.

Please replace the paragraph beginning at page 18, line 4, with the following amended paragraph:

JEN device 1002 includes elements described in FIG. 2 and associated with network device 112. Because JEN device 1002 includes a virtual machine, object-oriented applications and byte-codes can be processed. In particular, JEN device 1002 executes object-oriented applications, for example Java object-oriented applications or [[applies]] applets, and transmits commands to other network devices using the CLI-API described above.

Please replace the paragraph beginning at page 19, line 9, with the following amended paragraph:

Figure 11 illustrates a process 1100 that provides [[the]] operations an application performs to manage network devices using CLI-API 902 alone and in conjunction with RS-CLI device 1008. An application processes instructions designed to control a target network device (1102). In one implementation, this can be an object-oriented application written in Java executing on a Java enabled network device such as JEN 1002. The target network device can be like NJEN device 1004 which does not execute application instructions (written in Java or any other language) or like SNJEN 1006, which not only does not execute instructions in an application but only receives CLI commands over a serial port and not the network.

Please replace the paragraph beginning at page 19, line 22, with the following amended paragraph:

If the [[application]] target network device accepts CLI commands only over a serial interface (1104), CLI-API 902 directly transmits instructions from the application over the network to the network port on RS-CLI device 1008 attached to the target network device (1108). RS-CLI device 1008 creates corresponding CLI commands in response to application

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instructions (1110) and transmits them to the target network device over a serial port (1112). For example, RS-CLI device 1008 executes Java object-oriented applications or applets that generate CLI commands. While the application instructions in the Java object-oriented application are standard, the CLI commands generated by RS-CLI device 1008 are specific to the CLI used by the particular network device.